

REMARKS

I. Introduction

For the reasons set forth below, Applicants respectfully submit that all pending claims are patentable over the cited prior art references.

II. The Rejection Of Claims 1 And 2 Under 35 U.S.C. § 103

Claims 1 and 2 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kweon et al. (USP No. 6,783,890) in view of Okamura et al. (JP 06-150929). Applicants respectfully traverse this rejection for at least the following reasons.

With regard to the present invention, claim 1 recites a lithium ion secondary battery comprising: a positive electrode including a positive electrode active material comprising a lithium-containing composite oxide, a conductive material and a binder; a negative electrode; and a non-aqueous electrolyte, wherein said lithium-containing composite oxide is represented by the chemical formula: $\text{Li}_a(\text{Co}_{1-x-y}\text{Mg}_x\text{Al}_y)_b\text{M}_z\text{O}_c$ where M is at least one element selected from the group consisting of Na and K, and the values a, b, c, x, y and z respectively satisfy $0 \leq a \leq 1.05$, $0.005 \leq x \leq 0.15$, $0.0001 \leq y \leq 0.01$, $0.0002 \leq z \leq 0.008$, $0.85 \leq b \leq 1.1$ and $1.8 \leq c \leq 2.1$.

It is admitted that Kweon fails to teach Na or K as a component of the lithium-containing composite oxide in the positive electrode active material. However, it is alleged that it would have been obvious to combine Okamura, which teaches addition of Na or K in substitution for Li, with Kweon to obtain a battery of the present invention. Applicants respectfully submit that this combination is improper.

Kweon disclose a composite oxide in which the Co or Mn site in lithium cobaltate or lithium manganate is substituted with Mg or Al. Okamura, on the other hand, discloses a lithium composite oxide in which the Li site of lithium nickelate is substituted with Na or K. Okamura explains this feature in paragraphs [0009-0010] which recites:

“[0009] However, $\text{Li}_{1-x}\text{NiO}$ (where x is almost close to 1) or NiO_2 produced when LiNiO_2 is oxidized electrochemically by charging, as a result that almost all lithium is released in a high potential or all lithium is released therefrom, is chemically unstable, and is incapable of maintaining the layer structure as described above, thereby losing the reversibility of reaction. This is considered to be one of the causes of capacity degradation due to the charge-discharge cycles in a LiNiO_2 positive electrode.

[0010] The present invention intends to solve this problem by employing a material represented by the general formula $\text{Li}_x\text{M}_y\text{NiO}_2$ (where M is at least one selected from Na and K) for a positive electrode active material, in which lithium in LiNiO_2 is partially substituted for sodium and/or potassium”

As can be seen in this passage, the invention of Okamura is directed solely to the problems associated with a positive electrode active material comprised of lithium **nickelate**. Okamura is silent with respect to active mixtures containing cobalt or manganese. Thus, it would not be readily apparent to combine Okamura with Kweon, which is directed to electrodes comprised of lithium manganate or lithium cobaltate. Nor is there any suggestion in either reference to suggest the feasibility or desirability of such a combination.

Furthermore, if Okamura could have been applied to Kweon, the cycle characteristics would have been improved by the substitution of the *Li site* with Na or K. For example, Fig. 3 of Okamura shows that with no addition of Na and K for Li, the initial capacity is high, but the cycle characteristics are reduced. In contrast, with a minimum amount of addition of either Na or K being 0.1, the initial capacity is reduced, and the cycle characteristics are improved. However, in the present invention, the Co site in lithium cobaltate is substituted with Na or K, not the Li site. Moreover, the amount of substitution of Co in claim 1 (0.0002 – 0.008 molar ratio) is orders of magnitude less than those suggested in Okamura. As such, the positive electrode active material of the present invention cannot be obtained by the combination of Okamura and Kweon.

As is well known in patent law, "the test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art." *In re Kotzab*, 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000). Moreover, it is also well known that a patent composed of several elements is not proved obvious without identifying a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements (*KSR International Co. v. Teleflex Inc.*, 550 U.S. 14-15 (2007)). As Applicants have shown that there is no suggestion that the proposed combination of Kweon and Okamura would produce the positive electrode active material of the present invention, Applicants respectfully request that the § 103 rejection of claim 1 be withdrawn.

III. All Dependent Claims Are Allowable Because The Independent Claim From Which They Depend Is Allowable

Under Federal Circuit guidelines, a dependent claim is nonobvious if the independent claim upon which it depends is allowable because all the limitations of the independent claim are contained in the dependent claims, *Hartness International Inc. v. Simplimatic Engineering Co.*, 819 F.2d at 1100, 1108 (Fed. Cir. 1987). Accordingly, as claim 1 is patentable for the reasons set forth above, it is respectfully submitted that all pending dependent claims are also in condition for allowance.

IV. Rejection Of Claims 1 And 2 Under Nonstatutory Double Patenting Doctrine

Claims 1 and 2 have been rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1 and 3 of Okochi et al. (USP No. 7,150,942) in view of Okamura et al. (JP 06-150929). The Examiner alleges that the teachings of Okamura cited above combined with Okochi renders the present invention obvious.

However, as set forth in the arguments above, Okamura only discusses the substitution of Na or K for Li in lithium nickelate. As such, it would not be obvious for one of ordinary skill in the art to combine Okamura with Okochi, which is directed to a positive electrode mixture comprised of cobalt and magnesium, to obtain a material mixture of the present invention in which Na and K is substituted for Co. Accordingly, Applicants respectfully request that the double patenting rejection of claims 1-2 over Okamura and Okochi be withdrawn.

V. Conclusion

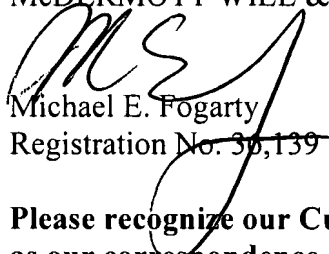
Having fully responded to all matters raised in the Office Action, Applicants submit that all claims are in condition for allowance, an indication for which is respectfully solicited.

Application No.: 10/771,411

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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